

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY)	2. REPORT TYPE	3. DATES COVERED (From - To)		
4. TITLE AND SUBTITLE		5a. CONTRACT NUMBER		
6. AUTHOR(S)		5b. GRANT NUMBER		
		5c. PROGRAM ELEMENT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)		5d. PROJECT NUMBER		
		5e. TASK NUMBER		
		5f. WORK UNIT NUMBER		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)		8. PERFORMING ORGANIZATION REPORT		
		10. SPONSOR/MONITOR'S ACRONYM(S)		
Air Force Research Laboratory (AFMC) AFRL/PRS 5 Pollux Drive Edwards AFB CA 93524-7048		11. SPONSOR/MONITOR'S NUMBER(S) <i>Please see attached</i>		
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution unlimited.				
13. SUPPLEMENTARY NOTES				
14. ABSTRACT				
20030205 285				
15. SUBJECT TERMS				
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Leilani Richardson
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified	A	19b. TELEPHONE NUMBER (Include area code) (661) 275-5015

101100VA

MEMORANDUM FOR PR (Contractor/In-House Publication)

FROM: PROI (TI) (STINFO)

04 Dec 2000

SUBJECT: Authorization for Release of Technical Information, Control Number: AFRL-PR-ED-AB-2000-230
Wassom, S.R. (Thiokol); Farmer, G.D. (SRS); Holmes, Michael R, "Solar Thermal Propulsion IHPRPT
Demonstration Program Results"

37th AIAA/ASME/SAE/ASEE Joint Propulsion Conference (Statement A)
(Salt Lake City, UT, 8-11 Jul 2001) (Deadline for Abstract: 08 Nov 00 - Extended)

1. This request has been reviewed by the Foreign Disclosure Office for: a.) appropriateness of distribution statement, b.) military/national critical technology, c.) export controls or distribution restrictions, d.) appropriateness for release to a foreign nation, and e.) technical sensitivity and/or economic sensitivity.

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Comments: _____

APPROVED/APPROVED AS AMENDED/DISAPPROVED

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Solar Thermal Propulsion IHPRPT Demonstration Program Results

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Abstract

Spacecraft powered by solar thermal propulsion engines will be able to provide the velocity change required to economically maneuver large payloads from one orbit to another or to perform interplanetary missions. This innovative concept, when applied, will double the efficiency of currently used LH₂ – LO₂ chemical upper stages. Solar thermal propulsion uses the sun's energy to heat a low molecular weight working fluid such as hydrogen to very high temperatures (3,000K). The stored thermal energy is then converted to kinetic energy as the working fluid exits a diverging nozzle.

Under Integrated High Payoff Rocket Propulsion Technology (IHPRPT) funding, the Air Force Research Lab (AFRL) has sponsored the team of Thiokol Propulsion and SRS Technologies to demonstrate the technological readiness and performance of an inflatable solar thermal propulsion system. This paper will address the results of this program, which includes the fabrication and thermal vacuum testing of a 4 X 6 meter inflatable flight quality solar concentrator. The program culminates in a full-up integrated proof-of-concept ground test of a direct gain solar thermal propulsion system. The results of this test will be reported. These tests will demonstrate that the technology is ready for development of flight hardware for Solar Orbital Transfer Vehicles.

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